The ethical issues of the application of artificial intelligence in healthcare: a systematic scoping review

Abstract

Artificial intelligence (AI) is being increasingly applied in healthcare. The expansion of AI in healthcare necessitates AI-related ethical issues to be studied and addressed. This systematic scoping review was conducted to identify the ethical issues of AI application in healthcare, to highlight gaps, and to propose steps to move towards an evidence-informed approach for addressing them. A systematic search was conducted to retrieve all articles examining the ethical aspects of AI application in healthcare from Medline (PubMed) and Embase (OVID), published between 2010 and July 21, 2020. The search terms were "artificial intelligence" or "machine learning" or "deep learning" in combination with "ethics" or "bioethics". The studies were selected utilizing a PRISMA flowchart and predefined inclusion criteria. Ethical principles of respect for human autonomy, prevention of harm, fairness, explicability, and privacy were charted. The search yielded 2166 articles, of which 18 articles were selected for data charting on the basis of the predefined inclusion criteria. The focus of many articles was a general discussion about ethics and AI. Nevertheless, there was limited examination of ethical principles in terms of consideration for design or deployment of AI in most retrieved studies. In the few instances where ethical principles were considered, fairness, preservation of human autonomy, explicability and privacy were equally discussed. The principle of prevention of harm was the least explored topic. Practical tools for testing and upholding ethical requirements across the lifecycle of AI-based technologies are largely absent from the body of reported evidence. In addition, the perspective of different stakeholders is largely missing.